

Microcomputers for The Farm and Ranch

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Rising costs of production and wide fluctuations in prices producers have received for agricultural commodities during the past few years underscore the need for a microcomputer as a new farm implement. Since 1972, prices of some agricultural products have changed more in 3 months than they did previously in 5 to 10 years. Under previous government agricultural programs, prices were relatively stable, compared to the current prices, and producers could plan their income and expenses more accurately. The present cost-price squeeze results in producers keeping a smaller percentage of each dollar that passes through their business than they did a decade ago.

The producer's major alternatives to maintain a level standard of living are to expand his business over more acres, to more intensively operate his current acreage or to "tighten up the management" on the existing operation.

Expansion usually requires additional financing, with associated cash flow problems, and also raises the debt-to-equity ratio. This makes the financial consequences of bad production and marketing decisions more severe. Young producers just getting started cannot afford to make the same management mistakes their fathers and predecessors did because today's young producers are operating on much narrower margins.

The necessity for wise decisions requires producers to have better tools for forward planning and better historical data on which to base projections. Farmers need a way to examine hundreds of alternatives in a short period of time to reduce mistakes made with real dollars in the real world.

Introduction of microcomputer technology in the mid-70's brought a new tool to the farm and ranch scene that can be applied to management decisions. The microcomputer is a small, powerful tool within financial reach of most producers, limited primarily by the user's vision.

Microcomputer Tasks

The financial management tasks a microcomputer can perform include:

- Budgeting and projections
- Record keeping
- Miscellaneous uses

Budgeting and projecting. Every farm and ranch manager must project costs and returns for the months and years ahead. Some managers do this in their head, some on the back of an envelope, others on the napkin at the coffee shop, some with the help of an accountant and others with a microcomputer.

Once a budget is developed by a microcomputer, the manager can quickly change the costs, yields or prices and print another complete budget. This quick print allows the manager to examine the financial consequences of as many "what if" situations as he wishes to consider. It provides the opportunity to consider consequences of alternatives before the production year begins and financial resources are committed. As the year progresses, the microcomputer allows the manager to consider the financial impact of unforeseen situations such as replants, blow outs, drought, falling prices, graze-out versus harvest, disease and alternatives under the government farm program.

The ability to look at the financial consequences of hundreds of alternative situations is probably the most financially and personally rewarding use of a microcomputer.

The microcomputer can keep track of the commodity markets and provide data that will help the farmer explore hedging alternatives. This can help producers receive higher or more certain prices.

The microcomputer also can help schedule field and livestock operations to ensure that sufficient time is allocated for each job that needs to be done.

Record keeping. Microcomputers can keep accurate financial records of the farm business. The manager can compare these to his budget projections to be sure he is proceeding financially as originally anticipated. This data also can be used as the basis for next year's budgets.

Financial records kept for tax purposes provide 50 to 60 percent of the records needed for better management decisions.

Records kept by the microcomputer can be used by the farmer to complete his own tax

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return or they can be provided to a tax accountant for additional tax planning and the year end tax return.

Although keeping records in the producer's office and providing them to the tax accountant may reduce the cost of preparing tax returns (assuming the accountant kept the records), this probably is not the highest monetary reward from using a microcomputer.

The microcomputer also can keep other kinds of records, such as physical inventories of grain in the bin, cattle in the feedlot, cattle on wheat pasture, breeding schedules, etc. It can summarize records on individual cows, calving weights, weaning weights and 205-day equivalent calf weights. It can provide costs for different pieces of machinery, least-cost and balanced rations and much more.

The amount of production information that can be kept on a microcomputer for the manager's use is limited mostly by the size of the computer storage units, programs available, the imagination of the manager and the use he would like to make of the recorded data.

Miscellaneous uses. The microcomputer can produce payroll records for easy filing of quarterly and annual reports; keep accounts receivable, mailing lists for Christmas cards, birthdays and cattle sales and even file favorite recipes. It can entertain the user with challenging games and teach times tables and speed reading. It also can be used for typing letters and producing form letters.

Computer Terms

To make the acquisition and application of microcomputers easier, the definition of a few terms is helpful.

"Hardware" in computer language is the physical piece of equipment that one can look at, touch and move about. The hardware in a typical microcomputer system for farm and ranch applications includes a printer for printing the reports, a computer "central processing unit" (CPU) to manipulate the data, two floppy disk drives for storage, a typewriter keyboard and television screen (CRT) for entering and reviewing data.

Hardware is similar to a tractor; it is useless by itself. A tractor cannot plow or plant. It is not used for transportation to and from town to purchase parts or haul grain. The tractor becomes a very useful tool, however, when an implement is attached to it. If a tillage implement is at-

tached, the tractor can plow. If a wagon is attached, it can haul; if a cultivator is attached, it will cultivate. The computer also is useless without an implement.

"Software" is to the computer what implements are to a tractor. Software is a set of instructions, called a program, stored on a disk or tape that the CPU uses to add, subtract, multiply, divide, sort and print information the operator puts into the computer.

If you put a budget program into the computer, the computer becomes a "budgeter." Enter a program into the computer that does accounting and the computer can do accounting. If you put a program into the computer for keeping production records, it becomes a record keeper. If you put a program into the computer that plays games, the computer becomes an amusing toy.

Software is the single most important item in any computer. Without software to do the desired task, a computer is almost useless. For agricultural purposes, it is much easier to buy hardware than to buy software. Software for agricultural users is scarce at this time.

It is useless to buy one kind of combine and a header made for another kind and expect to harvest grain without any modifications. It also is unreasonable to buy a computer from one manufacturer and software from another and expect them to operate without modifications. When purchasing microcomputers for agriculture, it is important to buy a model for which software has been developed or for which the farm manager can either develop software himself or hire someone to develop the software. Hiring special software written can be very expensive. If large programs are required, specially written software may cost more than the hardware.

Microcomputer Size

Microcomputers come in a range of sizes, colors, brand names and capabilities. The following configurations for microcomputers will adequately process most farm and ranch applications.

Computers are measured by the size of the storage unit (floppy disks), size of the central processing unit (CPU) and the speed of the printer. The unit of measure for computer size is the byte (pronounced bite). A byte is the amount of computer space required to store one character on the floppy disk or in the

central processing unit. For ease of communications, the byte capacity of computers is expressed in kilobytes, or thousands of bytes. In "normal computer ease," kilobyte is shortened to K and each thousand bytes are referred to as 1K.

All computer programs and data must be stored some place when the unit is turned off. Therefore, the first item to consider in purchasing a microcomputer for agricultural applications is the type and amount of available storage. The type of storage (disk or tape) determines the speed of loading programs or data and the reliability of entering the programs and data without error. Tape storage costs less than disk storage but it is very slow and much less reliable. Because farm and ranch applications require many different programs and often large volumes of data, two floppy disks are the best storage system for farm and ranch use. The combined disk drives should store at least 600,000 bytes (600K). This amount of storage is needed primarily for recording financial data, keeping production records and storing market data for analyzing marketing alternatives.

Considering the present state of microcomputer technology, the computer (CPU) should have at least 48K bytes of memory to process farm and ranch records and for most agricultural applications. Microcomputer memory comes in various capacities, from the smallest of 2 to 4K to more than 64K. Few commercially written programs require the CPU to have more than 48K.

For reference purposes, a printer is required. Printers come in several types and speeds. For typewriter quality printing, a "daisy wheel" type printer is required and it prints about 55 characters per second (CPS). If typewriter quality is not necessary, a faster "dot matrix" printer can be used.

For agricultural applications, a printer that can print 132 characters per line is recommended. This capacity will print reports from most agricultural programs. If the printer cannot "compress the print" so 132 characters print on 8½-inch paper, a 14-inch wide printer carriage is needed to print 132 characters on one line. This compressed print feature is useful in printing all reports on paper that can be easily filed for future reference.

Many commercially written programs use the compressed print feature. The manager

does not know what programs will be available in the near future for agricultural uses and what size the print out will be; therefore, he should purchase a printer that can handle at least 132 characters on one line.

Microcomputers usually operate on a single electronic "chip." The chips that make the computer work are made by several manufacturers. Some of the most common are 8080, Z80, 6502 or 6800 processor chips.

Computers must have some way to connect the memory and other special needs to the small micro processing chip. This connection is referred to as a buss. Computer manufacturers select a chip and buss for their needs and build a microcomputer. For farm and ranch applications, any chip and buss combination is acceptable if the software and disk storage is available for the manager's applications.

The typewriter keyboard should include a normal set of typewriter keys, plus a set of numbers on a "10-key pad" constructed like a 10-key adding machine. This 10-key pad aids input of numerical information.

The CRT (TV screen) comes in several sizes. The most popular sizes are: 80 characters wide and 24 lines; 64 characters wide and 16 lines; and 40 characters wide and 24 lines. The screen with 80 characters is the width of an 8½ x 11 page and allows the user to have a complete line of information presented on one line of the screen without "wrap around." This is the most desirable, from an ease of use standpoint.

Microcomputer Purchase

Before buying a microcomputer, decide what you want it to do for you. List functions needed, such as preparation of enterprise budgets, cash flow projections, capital budgets, inventory control, farm and ranch accounting, physical records, estimates of machinery and irrigation costs, herd management records, market information and others you may need. It may be difficult to define the need for an item you have never used.

Shop for software that will do all or most things you want done. This may take you to several software and computer manufacturers. Request detailed demonstrations and references of satisfied users before buying software. Above all else, you need good software.

The third step in acquiring a microcomputer is to decide on the required computer configuration. One configuration that should handle most farm and ranch applications is:

- 48K of the CPU memory
- 600K on two floppy disks
- 160 CPS (characters per second) printer with the ability for 132 characters per line. If the printer also is to be used for typewriter quality printing, it will print about 55 CPS. The printer should be a tractor feed (with holes on the side of the paper) rather than friction feed.
- 24- x 80-character display screen (CRT)
- A typewriter keyboard with 10-key pad as a part of the keyboard
- Necessary software (without this, hardware is nearly useless)
- Other special items you may require

Some software may be available on microcomputers that are smaller than the above configuration, but these systems may not be able to expand to handle future needs and may require costly conversions to get greater capacity.

Deal only with a reliable computer store with a dependable service center. Computers are an electronic/mechanical device that will require some repair and maintenance. One should be assured by the store's reputation and service to other customers that they both can and will maintain and repair your equipment as the need arises. Microcomputers are more dependable than previous large computers and require less costly maintenance. However, when maintenance is required, one needs to be assured that it will be available and timely.

Buy a microcomputer in one complete package with all required software operational. Some stores expect the producer to configure the computer and make software operational.

Your computer store/service center may provide you equipment with four separate manufacturers' labels. This is an acceptable alternative if you buy them as an operating unit. Very few microcomputer companies make their own disk drives, processing units and printers. Disk drives and processing chips for most microcomputer configurations are purchased from three or four major sources. Printers come in three or four major brands and are put together under different manufacturers' names and sold in various combinations. Your major concern should be that the store/service center sells and represents the system as a unit and will provide adequate software, service and maintenance.

When you purchase a microcomputer, buy a box of computer paper, at least 10 floppy disks to be used for storage of data and for making copies of programs and a book or two on how to program in Basic. A good instruction book about the Basic computer language allows you to read programs written by other people and make minor modifications as you become acquainted with your new implement.

An adequate microcomputer probably will cost less than a new pickup and can pay for itself in 1 to 3 years. A microcomputer is considered a farm implement by the Texas Comptroller of Public Accounts. As such, it is exempt from sales tax. When you purchase a microcomputer, provide the store/service center with a signed Texas sales tax exemption form as their authority for not collecting sales tax.

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3M—10-89, New